Two important improvements in navigation are also due to Sir William Thomson, — his improved mariner's compass, which has been adopted, we believe, by the British and French navies, and which is extensively in use upon large vessels generally; and his more recent invention of a navigational sounding-machine — navigational, as distinguished from the deep-sea sounding apparatus devised by him for purposes of research. The navigational sounding-machine permits of soundings being taken at intervals of a few minutes, in water of the depth of a hundred fathoms; and thus it gives navigators — who, it is to be hoped, will soon avail themselves of this new safeguard — the means of easily getting warning of danger long before it is imminent.

We cannot conclude even this brief and imperfect sketch of Sir William Thomson's work, without mention of the great treatise on natural philosophy upon which he and Professor Tait have united their labors.

To those who have had the privilege of personal contact with Sir William Thomson, his name will always be associated with the idea of personal lovableness and kindness, gentleness and modesty, even more than with that of scientific greatness. Every one who attended his recent lectures must have been deeply impressed with the truth of Helmholtz's remark, that "the gift to translate real facts into mathematical equations, and *vice versa*, is by far more rare than that to find the solution of a mathematical problem; and in this direction Sir William Thomson is most eminent and original." But he could hardly fail to be as strongly impressed with his possession, in an equally rare degree, of genuine and unaffected modesty, enthusiastic appreciation of the achievements of others, and tender consideration for all those whom the chances of time bring into connection with him, whether it be for a lifetime of friendship, or for a few fleeting weeks of union as teacher and pupil.

The accompanying portrait is after a crayon from a photograph taken in Montreal during the recent meeting of the British association.

THE NEW VOLCANO OF THE BERING SEA.[1]

SINCE the appearance in *Science* (vol. iii., No. 51, pp. 89–93) of Professor Dall's paper upon this new volcano, Lieut. G. M. Stoney, U.S.N., has embodied in an official report the results of a personal examination of this locality. It will be recalled that when Professor Dall surveyed the island of Ioanna Bogoslova (St. John the theologian) in 1873, seventy-seven years after its appearance by violent upheaval, he found, that with the exception of the small reef near Umnak, and of the rocks within a short distance of Bogoslova, there was water more than eight hundred fathoms in depth on all sides of the island.

In October, 1883, a violent disturbance burst forth, contemporaneous almost with that at Mount St. Augustine, described in *Science* (vol. iii., No. 54) by Professor Davidson, and resulting, as was believed, in the formation of a new island. The last reports of this, while agreeing materially with Professor Dall's conclusions, show, that, while no new island was formed, Bogoslova was extended; that the old volcano was supplemented by another, which is still active; and that where was relatively great depth of water there is now a land-formation nearly three hundred feet in height.

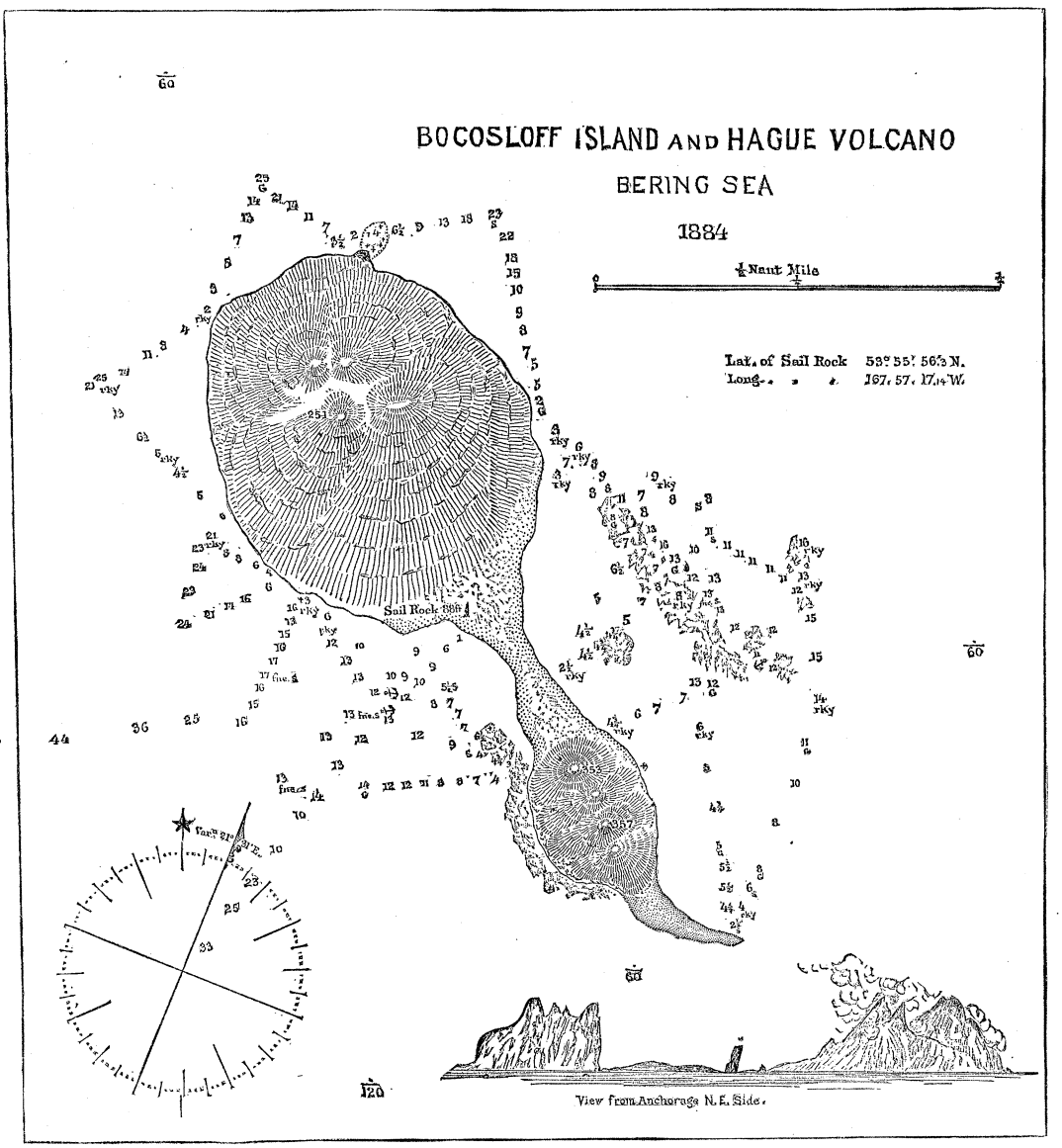
Lieut. Stoney reports that the new volcano was first seen by Capt. Hague in October, 1883, and suggests for it, in lieu of the name 'Grewingk' proposed by Dall, that of its discoverer.

There is no lack of definiteness as to the date of this new formation, all accounts agreeing that the violent eruptions began early in 1883, and culminated about the 16th of October, when "a dark cloud of indescribable appearance covered the sky northward from Unalashka, and hung very near the earth for some time, excluding the light of the sun, and accompanied by a rise of temperature. In about half an hour this cloud collapsed, and covered the earth with dull, gray, cottony ashes of extreme lightness." During this period the volcano of Makushin, on Unalashka, was quiet, though shocks were felt there; and in the subsequent survey, Stoney found that "the dust and ashes which fell in Unalashka were the same as those seen on the sides of the new volcano."

On the 27th of May of this year, Stoney saw, after leaving this last island, the smoke of the new volcano, then distant forty-five miles, and bearing south-west; and by three A.M. of the 28th it was in plain view, the base distinct,

[1] Communicated by the U. S. hydrographic office.

but the crater, save at rare intervals, hidden by masses of black and whitish smoke. What Hague and Dall supposed to be a new island was then seen to be a new formation, connected with the old island by a low sand-spit. Within its curve a narrow bay, well protected from northerly winds, was sighted; and, running in through thick volumes of sulphurous smoke, the schooner was anchored, amid bubbling water, in thirteen fathoms, with a sand and gravel bottom. This anchorage lay to the northward and eastward, and was supposed to be the best available; but subsequent surveys proved that another roadstead to the southward and westward was better, both in shelter and holding ground.



Three days were occupied in surveying the volcano; a hasty reconnoissance, made immediately after arrival, having satisfied Stoney that with the exception "of the occasional

shaking-up by shocks, and of the persistent odor of the sulphur," the anchorage was a safe one. The first impression of the volcano was its likeness to an immense lime-kiln; though when the intermittent masses of smoke from the crater and from the fissures, which in some cases extended to the water's edge, gave a clearer view, its jagged mouth and sides dispelled the illusion. At intervals the side crevices gave out only faint, pale ribbons of smoke, and then it was found that their edges were covered with incrustations of sulphur and of a white crystalline formation. A thermometer inserted an inch and a half below the crust reached its limit (250° F.) in a few seconds, the air temperature being at the same time 40° F. The crust was warm, though not unbearably so; but a stick placed against the heated rock blazed instantly.

As a rule, vibratory motion of the whole mass could not be discovered; though, with instruments, the explorer believed vibrations could be continuously detected. This statement rests upon the fact, that, when taking observations with the artificial horizon, the mercury was agitated so constantly as to permit accurate sights only at long intervals. Upon one occasion, while climbing the sides of the volcano, there was a most sensible vibration of the whole mass; and at the anchorage many shocks, both single and successive, were felt.

Rumbling sounds, and a dull roar similar to the discharge of distant cannon, were heard at intervals; and, though flames were seen only upon two occasions, yet this is believed to have been due to the little darkness of the season at that latitude.

The mass of the volcano was found "to be of a species of sand rock, with large black rocks scattered about the crust." No traces of lava, and but small quantities of pumice, were found. In some places the sand and cinders were ground to a fine powder, ankle-deep as a rule, but so yielding in places as to prevent an extended survey. The most careful examination revealed no trace of shells, though many of the rocks at the base "looked as if they had been exposed for a long period to the action of the water . . . and some of the rocks under water were still smoking." When the compass was taken ashore, marked local action was so noticeable as to prove the presence of iron.

Near the base of the volcano the water bubbled and broke, as if boiling, but no difference was found in the surface and bottom temperatures; and at the anchorage, where the same ebullition was apparent, there was a difference of one degree only between the same points.

Though one of the party reached the summit of the crater, no estimate of its periphery, depth, and apparent area, could be made. By repeated measurements the altitude of its summit was found to be three hundred and fifty-seven feet. Some discrepancies were found on the printed hydrography of the place; for example, the reef charted as extending from Bogosloff to Umnak does not exist.

Birds were found upon the old volcano in enormous numbers; gulls, shags, and sea-crows being so numerous, that, "when a gun was fired, the heavens would become black with them," and such as flew into the smoke of the belching hill, as many did, immediately perished. The sand-spit on the eastern shore, and the base rocks, were the resting-places for hundreds of sea-lions. No fish could be found, though lines were frequently put over; and, strangely enough, it is recorded, that, three days before the eruption on Augustin Island, all the fish are said to have disappeared from Port Graham.

CANAL ROUTES BETWEEN THE ATLANTIC AND THE PACIFIC.

INTERNAL canals, or canals connecting different parts of the same country, are now rarely constructed; and many formerly in use have been dried up, and superseded by railways; while ship-canals are becoming more common and of greater importance than internal canals have ever been. The opening of the Suez canal has brought back to the Mediterranean the commerce of the east. Greece will soon have a canal through the Isthmus of Corinth, with its outlet at the Piraeus of Athens; and the Dutch are constructing a ship-canal to connect Amsterdam directly with the sea. In England a canal is to be built from the ocean to Manchester, which will make that city a seaport town, and transfer to it a large portion of Liverpool's commerce. In France a canal is proposed between the Mediterranean and the Bay of Biscay; and in Massachusetts a canal is cutting across Cape Cod.

Besides the Panama canal, there are two projects for connecting the Atlantic and Pacific Oceans, — the Tehuantepec route, advocated by Capt. Eads, the engineer of the great railway bridge at St. Louis and of the water-way at the mouth of the Mississippi River; and the Nicaragua route, by Capt. Bedford Pim of the British navy, for a long time favorably known to the scientific world. He was the first man who marched from a ship coming